CLAIMS:

1. An ignition coil module having an imaginary longitudinal centerline and comprising:

a primary coil for conducting primary electric current;

a secondary coil that is electromagnetically coupled with the primary coil for delivering a spark plug firing voltage when primary current conducted by the primary coil abruptly changes;

a bobbin comprising an imaginary centerline disposed coincident with the module centerline and comprising a sidewall having an inner surface that laterally bounds a hollow interior space and an outer surface on which one of the coils is disposed; and

a ferromagnetic core that is disposed within the interior space of the bobbin, that has a longitudinal centerline coincident with the centerlines of both the module and the bobbin, and that comprises an outer surface having a confronting area which confronts and is spaced from a confronted area of the inner surface of the bobbin sidewall;

wherein the confronting area of the outer surface of the core and the confronted area of the inner surface of the bobbin sidewall are disposed on respective imaginary frustums having their centerlines coincident with the centerlines of the core and the bobbin.

2. An ignition coil module as set forth in Claim 1 in which the cone angle of the frustoconical inner surface of the bobbin wall and the cone angle of the frustoconical outer surface of the core provide a generally uniform spacing distance between the confronting and confronted areas along the longitudinal extent of the areas.

3. An ignition coil module as set forth in Claim 2 in which the module comprises a proximal longitudinal end and a distal longitudinal end, and along the module centerline, the radius of the frustoconical inner surface of the bobbin wall and the radius of the frustoconical outer surface of the core become progressively smaller in the direction from the proximal longitudinal end toward the distal longitudinal end.

4. An ignition coil module as set forth in Claim 3 in which the module further comprises, at the proximal longitudinal end, electric terminals connected to the primary coil for electrically connecting the primary coil to an electric circuit for supplying primary electric current to the primary coil, and at the distal longitudinal end, an electric terminal connected to the secondary coil for mating contact with a spark plug terminal.

5. An ignition coil module as set forth in Claim 1 in which the secondary coil is disposed on the outer surface of the bobbin, and the module further includes another bobbin which is disposed radially outward of the secondary coil and on which the primary coil is disposed.

6. An ignition coil module as set forth in Claim 1 in which the bobbin comprises a molded synthetic part.

7. An ignition coil module as set forth in Claim 6 in which the bobbin comprises formations in the molded synthetic part that coact with features of the core to establish coincidence of the core centerline with the bobbin centerline.

8. An ignition coil module as set forth in Claim 7 in which the formations in the molded synthetic part that coact

with features of the core to establish coincidence of the core centerline with the bobbin centerline comprise a first formation in the molded synthetic part toward the proximal end of the module and a second formation in the molded synthetic part toward the distal end of the module, and the second formation comprises raised surface areas that in radial cross section are inclined at an acute angle to the bobbin centerline and act to center the core to the bobbin at the distal end of the core.

9. An ignition coil module as set forth in Claim 8 in which the core comprises at least one key toward the proximal end of the module, and the first formation comprises at least one key receptacle receiving the at least one key of the core to center the core to the bobbin at the proximal end of the core and to constrain the core against turning about its centerline within the bobbin.

10. An ignition coil module as set forth in Claim 9 in which the at least one key comprises plural keys projecting outward from the core toward the bobbin at different circumferential locations around the core, the at least one key receptacle comprises plural key receptacles each receiving a respective key of the core, and further including a retainer fitting to the proximal end of the bobbin to capture the core within the bobbin and comprising plural keys extending from a ring to be received in the key receptacles of the bobbin to capture the keys of the core in the key receptacles of the bobbin.

11. An ignition coil module as set forth in Claim 8 including a retainer fitting to the proximal end of the bobbin to capture the core within the bobbin.

12. An ignition coil module as set forth in Claim 11 further including a magnetic circuit element that is captured between the retainer and a longitudinal end of the core and that the retainer centers to the core.

13. An ignition coil module having an imaginary longitudinal centerline and comprising:

a primary coil for conducting primary electric current;

a secondary coil that is electromagnetically coupled with the primary coil for delivering a spark plug firing voltage when primary current conducted by the primary coil abruptly changes;

a bobbin comprising an imaginary centerline disposed coincident with the module centerline and comprising a sidewall having an inner surface that laterally bounds a hollow interior space and an outer surface on which the secondary coil is disposed;

a ferromagnetic core that is disposed within the interior space of the bobbin, that has a longitudinal centerline coincident with the centerlines of both the module and the bobbin, and that comprises an outer surface having a confronting area which confronts and is spaced from a confronted area of the inner surface of the bobbin sidewall; and

encapsulant disposed in the interior space of the bobbin between the confronting area of the outer surface of the core and the confronted area of the inner surface of the bobbin sidewall.

14. An ignition coil module as set forth in Claim 13 including a retainer that fits to the proximal end of the bobbin to capture the core within the bobbin.

15. An ignition coil module as set forth in Claim 14 including a magnetic circuit element that is captured

between the retainer and the core, and in which the retainer comprises a formation that acts on the magnetic circuit element to cause the magnetic circuit element to be centered with respect to the core.

16. A ferromagnetic core having an imaginary longitudinal centerline and comprising:

a stack of individual flat laminations arranged parallel to the centerline, wherein

two of the laminations bound the stack,

each lamination comprises opposite longitudinal edges that are non-parallel to the centerline to endow zones at opposite sides of the core with a substantially frustoconical profile, and

the zones are separated by flat outer faces of the two laminations bounding the stack.

17. A ferromagnetic core as set forth in Claim 16 in which some of the laminations comprise tabs projecting outward from their longitudinal edges beyond the frustoconical profile.

18. A ferromagnetic core as set forth in Claim 17 in which the opposite longitudinal edges of the two laminations bounding the stack comprise such tabs at their proximal ends.

19. A ferromagnetic core having an imaginary longitudinal centerline running from a proximal end to a distal end and comprising:

a stack of individual flat laminations arranged parallel to the centerline, wherein

two of the laminations bound the stack,

each lamination comprises opposite longitudinal edges that endow opposite sides of the core with zones that have

a defined longitudinal profile and that are separated by flat outer faces of the two laminations bounding the stack, and

some of the laminations comprise tabs projecting outward from their longitudinal edges beyond the defined longitudinal profile.

20. A ferromagnetic core as set forth in Claim 19 in which the opposite longitudinal edges of the two laminations bounding the stack comprise such tabs at their proximal ends.

21. A ferromagnetic core as set forth in Claim 20 in which the opposite longitudinal edges of respective laminations with which the two laminations bounding the stack are respectively in contact comprise such tabs in contact with the respective tabs of the two laminations bounding the stack.

22. A ferromagnetic core as set forth in Claim 21 in which the defined longitudinal profile is described by an imaginary frustum that tapers radially inward toward the distal end.

23. An ignition coil module having an imaginary longitudinal centerline and comprising:

a primary coil for conducting primary electric current;

a secondary coil that is electromagnetically coupled with the primary coil for delivering a spark plug firing voltage when primary current conducted by the primary coil abruptly changes;

a bobbin comprising an imaginary centerline disposed coincident with the module centerline and comprising a sidewall having an inner surface that laterally bounds a

hollow interior space and an outer surface on which one of the coils is disposed;

a ferromagnetic core that is disposed within the interior space of the bobbin, that has a longitudinal centerline coincident with the centerlines of both the module and the bobbin, and that comprises an outer surface having a confronting area which confronts and is spaced from a confronted area of the inner surface of the bobbin sidewall;

a retainer that fits to the proximal end of the bobbin to capture the core within the bobbin; and

wherein the retainer comprises a ring that is disposed within the interior space and comprises formations that provide clearance to the bobbin sidewall to allow encapsulant that is introduced into the interior space via the proximal end of the bobbin to flow past the retainer and fill the interior space between the confronting and confronted areas.

24. An ignition coil module as set forth in Claim 23 in which the retainer ring comprises proximal and distal faces, and the formations in the ring comprise at least one concave recess in each face that passes radially through the ring between a radially inner face of the ring and a radially outer face of the ring.

25. An ignition coil module as set forth in Claim 24 in which the at least one concave recess in the proximal face of the ring is circumferentially indexed from the at least one concave recess in the distal face of the ring.

26. An ignition coil module as set forth in Claim 25 in which the at least one concave recess in the proximal face of the ring comprises two concave recesses opposite each other, and the at least one concave recess in the

distal face of the ring comprises two concave recesses opposite each other and circumferentially indexed from the two recesses in the proximal face of the ring.

27. An ignition coil module as set forth in Claim 24 in which the core, the retainer, and the bobbin comprise respective formations that circumferentially locate the core to the bobbin and circumferentially locate the retainer to the bobbin so as to thereby circumferentially relate the concave recesses to the core.

28. An ignition coil module as set forth in Claim 23 further including a cylindrical magnetic circuit element disposed between the ring and the proximal end of the core and wherein the ring acts to center the magnetic circuit element to the core.

29. An ignition coil module as set forth in Claim 23 further including encapsulant disposed in the interior space of the bobbin between the confronting and confronted areas.

30. An ignition coil module as set forth in Claim 23 in which one of the retainer and the bobbin comprises at least one catch that catches the one of the retainer and the bobbin to the other.

31. A method of encapsulating a ferromagnetic core within a bobbin of an ignition coil module, the method comprising:

providing a bobbin comprising a sidewall having an exterior surface on which one of a primary and a secondary coil is disposed and an interior surface bounding a hollow interior space that is open at a longitudinal end;

disposing a ferromagnetic core within the hollow interior of the bobbin via the open longitudinal end of the

bobbin, including circumferentially locating the core to the bobbin and placing an imaginary longitudinal centerline of the core coincident with an imaginary longitudinal centerline of the bobbin; and

capturing the core within the bobbin by disposing on the bobbin at the open longitudinal end, a retainer that has a cooperation with the bobbin allowing encapsulant to flow past the retainer; and

flowing encapsulant into the interior space of the bobbin to encapsulate the core by introducing encapsulant through the open longitudinal end of the bobbin and flowing encapsulant past the retainer.

32. A method as set forth in Claim 31 in which the step of capturing the core within the bobbin by disposing the retainer on the bobbin at the open longitudinal end comprises catching the retainer to the bobbin by a catch on one of the retainer and the bobbin.